

# Claims

- [c1] 1.A method of forming a high-temperature gas seal comprising the steps of:
- (a) combining a ceramic component with a reactive component;
  - (b) installing the seal in between first and second contact surfaces; and
  - (c) converting the reactive component to a corresponding ceramic material in situ.
- [c2] 2.The method of claim 1 wherein the reactive component bonds to itself, to the ceramic component and to the first and second contact surfaces during conversion.
- [c3] 3.The method of claim 1 wherein the ceramic component comprises a ceramic felt or paper or ceramic particles and wherein the reactive component comprises metal particles or metal precursors and wherein the ceramic particles and the metal particles are impregnated within the ceramic felt or paper by dipping the felt or paper into a slurry comprising the ceramic particles and the metal particles.
- [c4] 4.The method of claim 2 wherein the metal particles is

selected from the group consisting of aluminium, titanium, silicon, magnesium and zirconium.

- [c5] 5.The method of claim 1 wherein the conversion of the reactive component comprises oxidation of the reactive component with a volumetric increase.
- [c6] 6.The method of claim 1 wherein the reactive component and the ceramic component are mixed in a suitable slurry formulation and the seal is formed by tape-casting or slip casting.
- [c7] 7.The method of claim 3 wherein the metal particles comprise aluminium and the ceramic component comprises alumina.
- [c8] 8.A high-temperature gas seal formed by the method of claim 1, 2, 3, 4, 5, 6 or 7.
- [c9] 9.A seal comprising a reactive component and a ceramic component, wherein the reactive component may be converted to a corresponding ceramic material in situ.
- [c10] 10.The seal of claim 9 wherein the reactive component comprises metallic, semi-metallic or metal precursor particles and wherein the ceramic component comprises ceramic particles.
- [c11] 11.The seal of claim 10 wherein the reactive component

particles are selected from the group consisting of aluminium, zirconium, yttrium, titanium, calcium, magnesium and silicon, or mixtures thereof.

[c12] 12.The seal of claim 11 wherein the reactive component particles comprise aluminium particles and wherein the ceramic component comprises alumina particles.

[c13] 13.The seal of claim 12 wherein the ceramic component further comprises alumina fibres.

[c14] 14.A seal comprising a reactive component and a ceramic component, wherein the reactive component comprises a ceramic material which has been converted from a metallic, semi-metallic or metal precursor material to a corresponding ceramic material in situ.